If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match.
The on-screen version of the Collider-Accelerator Department Procedure is the Official Version.
Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A.

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

4.120.52.e U-Upstream & V-Target (PEER 23) Mode 24 Tests

C-A-OPM Procedures in which this Attachment is used.		
4.120.52		

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved:_____***Signature on File***_____ _____
Collider-Accelerator Department Chairman Date

V. Castillo

4.120.52.e U-Upstream & V-Target (PEER 23) Mode 24 Tests

PASS ANNUAL ACCEPTANCE TEST PROTOCOL

Division A Software Filename and Checksum: Title:_____ Checksum: _____

Division B Software Filename and Checksum: Title:_____ Checksum: _____

Initial testing complete:

Test Team Leader's Name (Print): _____Life Number:_____

Test Team Leader's Name (Sign): _____Date:_____/_____/_____

Acceptance test procedure complete (following repairs and retesting if required):

Test Team Leader's Name (Print): _____ Life Number:_____

Test Team Leader's Name (Sign): _____Date:_____/_____/_____

Test results reviewed by:

Safety Section Head's Name (Print):_____ Life Number:_____

Safety Section Head's Name (Sign):_____Date:_____/_____/_____

Test results accepted by Radiation Safety Committee:

RSC Member's Name (Print):_____Life Number: _____

RSC Member's Name (Sign):_____Date:_____/_____/_____

1.1 Test Critical Devices: AGS Injection Enable 1(AGS1/PS BF6) and AGS Injection Enable 2 (AGS2/PS DH2,3) can only be enabled in No Access Mode (Mode 24)

	PLACE	**Peer 23** in **Controlled Access (Mode 16)**	
□	**VERIFY**	**MCR** sees **Peer 23** is in	**MODE 16**
	AT	Bldg 921 **Critical Device Enclosure #5470**	
□	**VERIFY**	Relay **5470 K10** AGS Injection Enable 1 **Div A** is	**OFF**
□	**VERIFY**	Relay **5470 K9** AGS Injection Enable 1 **Div B** is	**OFF**
□	**VERIFY**	Relay **5470 K3** AGS Injection Enable 2 **Div A** is	**OFF**
□	**VERIFY**	Relay **5470 K4** AGS Injection Enable 2 **Div B** is	**OFF**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS Injn: Div A** □ and **Div B** □	**Safely Off**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS1: Div A** □ and **Div B** □	**OFF**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS2: Div A** □ and **Div B** □	**OFF**
	SWEEP	Areas **U up** and **V Target**	
□	**VERIFY**	Areas **U up** □**,** and **V Target** □ are	**SWEPT**
	PLACE	**Peer 23** in **No Access (Mode 24)**	
□	**VERIFY**	**Peer 23** is in	**MODE 24**
	AFTER	**90 sec** time-out	
	AT	Bldg 921 **Critical Device Enclosure #5470**	
□	**VERIFY**	Relay **5470 K10** AGS Injection Enable 1 **Div A** is	**ON**
□	**VERIFY**	Relay **5470 K9** AGS Injection Enable 1 **Div B** is	**ON**
□	**VERIFY**	Relay **5470 K3** AGS Injection Enable 2 **Div A** is	**ON**
□	**VERIFY**	Relay **5470 K4** AGS Injection Enable 2 **Div B** is	**ON**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS Injn: Div A** □ and **Div B** □	**Not Safely Off**
	TURN OFF	**Feed-forward** switch	
□	**VERIFY**	Feed-forward **switch** is	**OFF**
	TURN ON	**PS BF6** to **~ 100 Amps**	
□	**VERIFY**	**MCR** sees on PASS Testing **AGS1: Div A** □ and **Div B** □	**ON**
	TURN ON	**PS DH2,3** to **~ 100 Amps**	
□	**VERIFY**	**MCR** sees on PASS Testing **AGS2: Div A** □ and **Div B** □	**ON**
	UNCAPTURE	**Any key** in the **Uup-Vtgt** keytree	
□	**VERIFY**	**MCR** sees **Peer 23** go to	**MODE 2**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS Injn: Div A** □ and **Div B** □	**Safely Off**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS1: Div A** □ and **Div B** □	**OFF**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS2: Div A** □ and **Div B** □	**OFF**
	AT	Bldg 921 **Critical Device Enclosure #5470**	
□	**VERIFY**	Relay **5470 K10** AGS Injection Enable 1 **Div A** is	**OFF**
□	**VERIFY**	Relay **5470 K9** AGS Injection Enable 1 **Div B** is	**OFF**
□	**VERIFY**	Relay **5470 K3** AGS Injection Enable 2 **Div A** is	**OFF**
□	**VERIFY**	Relay **5470 K4** AGS Injection Enable 2 **Div B** is	**OFF**
□	**VERIFY**	**Attempt** to turn on **PS BF6**	**FAIL**
□	**VERIFY**	**Attempt** to turn on **PS DH2,3**	**FAIL**

	RECAPTURE	**Key**	
	PLACE	**Peer 23** in **Restricted Access (Mode 8)**	
□	**VERIFY**	**MCR** sees **Peer 23** is in	**MODE 8**
	AT	Bldg 921 **Critical Device Enclosure #5470**	
□	**VERIFY**	Relay **5470 K10** AGS Injection Enable 1 **Div A** is	**OFF**
□	**VERIFY**	Relay **5470 K9** AGS Injection Enable 1 **Div B** is	**OFF**
□	**VERIFY**	Relay **5470 K3** AGS Injection Enable 2 **Div A** is	**OFF**
□	**VERIFY**	Relay **5470 K4** AGS Injection Enable 2 **Div B** is	**OFF**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS Injn: Div A** □ and **Div B** □	**Safely Off**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS1: Div A** □ and **Div B** □	**OFF**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS2: Div A** □ and **Div B** □	**OFF**
□	**VERIFY**	**Attempt** to turn on **PS BF6**	**FAIL**
□	**VERIFY**	**Attempt** to turn on **PS DH2,3**	**FAIL**
	PLACE	**Peer 23** in **Controlled Access (Mode 16)**	
□	**VERIFY**	**MCR** sees **Peer 23** is in	**MODE 16**
	AT	Bldg 921 **Critical Device Enclosure #5470**	
□	**VERIFY**	Relay **5470 K10** AGS Injection Enable 1 **Div A** is	**OFF**
□	**VERIFY**	Relay **5470 K9** AGS Injection Enable 1 **Div B** is	**OFF**
□	**VERIFY**	Relay **5470 K3** AGS Injection Enable 2 **Div A** is	**OFF**
□	**VERIFY**	Relay **5470 K4** AGS Injection Enable 2 **Div B** is	**OFF**
□	**VERIFY**	**Attempt** to turn on **PS BF6**	**FAIL**
□	**VERIFY**	**Attempt** to turn on **PS DH2,3**	**FAIL**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS Injn: Div A** □ and **Div B** □	**Safely Off**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS1: Div A** □ and **Div B** □	**OFF**
□	**VERIFY**	**MCR** sees on PASS Testing **AGS2: Div A** □ and **Div B** □	**OFF**

□ **Check for acceptance of Test Critical Devices: AGS Injection Enable 1(AGS1/PS BF6) and AGS Injection Enable 2 (AGS2/PS DH2,3) can only be enabled in No Access Mode (Mode 24)**

1.2 Test Critical Devices: AGS Injection Enable 1(AGS1/PS BF6) and AGS Injection Enable 2(AGS2/PS DH2,3) and Reachback Devices: Booster Injection Enable 1(BS1) and Booster Injection Enable 2(BS2) respond to U-Up & V-Target Security System Chipmunk Radiation Interlocks sensed by A or B Division.

	PLACE	Peer 23 in **Mode 2**	
□	**VERIFY**	Peer 23 is in **SafeAccess**	**MODE 2**
	DETACH	Cable from any **Security System** U-Up & V-Tgt **Chipmunk NMO# _____**	
□	**VERIFY**	**MCR** sees Chipmunk as	**TRIP & FAILSAFE**
	RESET	**Trip & Failsafe** at **MCR**	
□	**VERIFY**	Attempt to **reset Trip & Failsafe** at **MCR**	**FAIL**
	CONNECT	Chipmunk **Test box** to the **Chipmunk cable**	
□	**VERIFY**	**MCR** sees Chipmunk as	**O.K.**
	PLACE	Peer 23 in **No Access (Mode 24)**	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 24**
	TURN ON	**BF6 & DH2,3** Feed-forward **Switch**	
□	**VERIFY**	**BF6 & DH2,3** Feed-forward **Switch**	**ON**
	OPEN	Reachback Devices**: BS1** and **BS2**	
□	**VERIFY**	**MCR** sees **Reachback Devices: BS1** □ and **BS2** □ go to	**OPENED**
	AT	Bldg 914 **Critical Device Encl # 4576**	
□	**VERIFY**	**PS BF6 Interlock** light is	**OFF**
	AT	Bldg 914 **Critical Device Encl # 4577**	
□	**VERIFY**	**PS DH2,3 Interlock** light is	**OFF**
□	**VERIFY**	**MCR** sees in Interruptions **Crit. Devices: BF6** □ and **DH2, 3** □	**DISABLED**
	ENABLE	**PS BF6** and **PS DH2,3**	
	AT	Bldg 914 **Critical Device Encl # 4576**	
□	**VERIFY**	**PS BF6 Interlock** light is	**ON**
	AT	Bldg 914 **Critical Device Encl # 4577**	
□	**VERIFY**	**PS DH2,3 Interlock** light is	**ON**
□	**VERIFY**	**MCR** sees in Interruptions **Crit. Devices: BF6** □ and **DH2, 3** □	**ENABLED**
	PRESS	**A Div Trip** button on **Test Box**	
□	**VERIFY**	**Peer 23** remains in **No Access**	**Mode 24**
□	**VERIFY**	**MCR** sees **Div A** radiation	**TRIP**
	AT	Bldg 914 **Critical Device Encl # 4576**	
□	**VERIFY**	**PS BF6 Interlock** light is	**OFF**
	AT	Bldg 914 **Critical Device Encl # 4577**	
□	**VERIFY**	**PS DH2,3 Interlock** light is	**OFF**
□	**VERIFY**	**MCR** sees in Interruptions **Crit. Devices: BF6** □ and **DH2, 3** □	**DISABLED**
	TURN OFF	**BF6 & DH2,3** Feed-forward **Switch**	
□	**VERIFY**	**BF6 & DH2,3** Feed-forward **Switch**	**OFF**
□	**VERIFY**	**MCR** sees **Reachback Devices: BS1** □ and **BS2** □ go to	**CLOSED**
	CLEAR	Rad **TRIP**	

□	**VERIFY**	Rad **TRIP** is	**CLEARED**
	OPEN	Reachback Devices**: BS1** and **BS2**	
□	**VERIFY**	**MCR** sees **Reachback Devices: BS1** □ and **BS2** □ go to	**OPENED**
	AT	Bldg 914 **Critical Device Encl # 4576**	
□	**VERIFY**	**PS BF6 Interlock** light is	**OFF**
	AT	Bldg 914 **Critical Device Encl # 4577**	
□	**VERIFY**	**PS DH2,3 Interlock** light is	**OFF**
□	**VERIFY**	**MCR** sees in Interruptions **Crit. Devices: BF6** □ and **DH2, 3** □	**ENABLE**
	ENABLE	**PS BF6** and **PS DH2,3**	
	AT	Bldg 914 **Critical Device Encl # 4576**	
□	**VERIFY**	**PS BF6 Interlock** light is	**ON**
	AT	Bldg 914 **Critical Device Encl # 4577**	
□	**VERIFY**	**PS DH2,3 Interlock** light is	**ON**
□	**VERIFY**	**MCR** sees in Interruptions **Crit. Devices: BF6** □ and **DH2, 3** □	**ENABLED**
	PRESS	**B Div Trip** button on **Test Box**	
□	**VERIFY**	**Peer 23** remains in **No Access**	**Mode 24**
□	**VERIFY**	**MCR** sees **Div B** radiation	**TRIP**
	AT	Bldg 914 **Critical Device Encl # 4576**	
□	**VERIFY**	**PS BF6 Interlock** light is	**OFF**
	AT	Bldg 914 **Critical Device Encl # 4577**	
□	**VERIFY**	**PS DH2,3 Interlock** light is	**OFF**
□	**VERIFY**	**MCR** sees in Interruptions **Crit. Devices: BF6** □ and **DH2, 3** □	**DISABLED**
	AT	Bldg 914 **Critical Device Encl # 4576**	
	TURN ON	**BF6 & DH2,3** Feed-forward **Switch**	
□	**VERIFY**	**BF6 & DH2,3** Feed-forward **Switch**	**ON**
□	**VERIFY**	**MCR** sees **Reachback Devices: BS1** □ and **BS2** □ go to	**CLOSED**
	CLEAR	Rad **TRIP**	
□	**VERIFY**	Rad **TRIP** is	**CLEARED**
	DETACH	Chipmunk **Test box** from cable	
	CONNECT	**Chipmunk** to cable	
□	**VERIFY**	**Chipmunk** is	**CHIRPING**
□	**VERIFY**	**MCR** sees **Chipmunk** as	**O.K.**

□ **Check for acceptance of Test Critical Devices: AGS Injection Enable 1(AGS1/PS BF6) and AGS Injection Enable 2(AGS2/PS DH2,3) and Reachback Devices: Booster Injection Enable 1(BS1) and Booster Injection Enable 2(BS2) respond to U-Up & V-Target Security System Chipmunk Radiation Interlocks sensed by A or B Division.**

1.3 Test of Crash Operators in U-Up area

STATION **Test personnel** in **U-Up** area

PLACE **Peer 23** in **No Access Mode**

□ **VERIFY** **MCR** sees **Peer 23** in **MODE 24**

□ **VERIFY** **No Access Alarm** for **Div A** □ and **Div B** □ is **ON**

FOLLOW Tests in **Table 2** below

Pull Crash cord while alarm sounds	**Verify Alarm stops**		**Verify Peer 23 goes to Mode 2**		**Reset Crash**	**Place Peer 23 in Mode 24**	
	Div A	**Div B**	**Div A**	**Div B**			
Uup CO –1	□	□	□	□			**End of test**

Table 2 – Test of Crash Operator in U-Up area

□ **Check for acceptance of Test of Crash Operator in U-Up area**

1.4 Test of Mode 24 indication on V-Target area Gate Box

PLACE **Peer 23** in **No Access Mode**

□ **VERIFY** **MCR** sees **Peer 23** in **MODE 24**

□ **VERIFY** At V-Target gate box **No Access** light is **ON**

□ **Check for acceptance of Test of Mode 24 indication on V-Target area Gate Box**

1.5 Test that opening gate UGE1 in No Access, Mode 24, causes Peer 23 to go to Safe mode

□ **VERIFY** Hardware □, Electrical □ at UGE1 is **O.K.**

STATION **Test personnel** inside **UGE1** gate

PLACE **Peer 23** in **No Access** mode

□ **VERIFY** **MCR** sees **Peer 23** in **MODE 24**

□ **VERIFY** Alarms for **Div A** □ and **Div B** □ **O.K.**

□ **VERIFY** At **UGE1** gate box **No Access** light is **ON**

WAIT For 90 sec **timeout** to **expire**

□ **VERIFY** Attempt to open gate **UGE1** with **Simultaneous Release** and **#6 CA key** **FAIL**

OPEN Gate **UGE1** from **inside** and **hold open**

□	**VERIFY**	**MCR** sees **Peer 23** Div A □ and Div B □ go to	**MODE 2**
□	**VERIFY**	**MCR** sees **UGE1 gate** Div A □ and Div B □	**OPEN**
□	**VERIFY**	**MCR** sees **Peer 23 U-Up** Div A □ and Div B □	**NO SWEEP**
	CLOSE	Gate **UGE1**	
□	**VERIFY**	**MCR** sees **UGE1 gate** Div A □ and Div B □	**NOT RESET**
	PLACE	**Peer 23** in **Restricted Access** mode	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 8**

□ **Check for acceptance of Test that opening gate UGE1 in No Access, Mode 24, causes Peer 23 to go to Safe mode**

1.6 Test that opening gate UGI1 in No Access, Mode 24, causes Peer 23 to go to Safe mode

□	**VERIFY**	Hardware □**,** Electrical □ at UGI1 is	**O.K.**
	STATION	**Test personnel** inside **UGI1** gate	
	PLACE	**Peer 23** in **No Access** mode	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 24**
□	**VERIFY**	Alarms for **Div A** □ and **Div B** □	**O.K.**
□	**VERIFY**	At **UGI1** gate box **No Access** light is	**ON**
	WAIT	For 90 sec **timeout** to **expire**	
□	**VERIFY**	Attempt to open gate **UGI1** with **Simultaneous Release** and **Zero key** from **U-down (Peer 25)** side	**FAIL**
	OPEN	Gate **UGI1** from **inside (U-up / Peer 23** side) and **hold open**	
□	**VERIFY**	**MCR** sees **Peer 23** Div A □ and Div B □ go to	**MODE 2**
□	**VERIFY**	**MCR** sees **UGI1 gate** Div A □ and Div B □	**OPEN**
□	**VERIFY**	**MCR** sees **Peer 23 U-Up** Div A □ and Div B □	**NO SWEEP**
	CLOSE	Gate **UGI1**	
□	**VERIFY**	**MCR** sees **UGI1 gate** Div A □ and Div B □	**NOT RESET**
	PLACE	**Peer 23** in **Restricted Access** mode	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 8**

□ **Check for acceptance of Test that opening gate UGI1 in No Access, Mode 24, causes Peer 23 to go to Safe mode**

1.7 Test that all keys captive is a necessary condition for No Access mode

	PLACE	**Peer 23** in **Restricted Access** mode	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 8**
	CAPTURE	All **EB006** and **EB007** keys	
□	**VERIFY**	**All** EB006: 1 □, 2 □, 3 □, 4 □, 5 □, 6 □ and EB007: 1 □, 2 □ are	**CAPTURED**
	AT	**Above MCR** terminal room	
□	**VERIFY**	**Peer 1A** output **3/0** is	**ON**
□	**VERIFY**	**Peer 1B** output **2/16** is	**ON**
	FOLLOW	Tests in **Table 3**, below	

Remove key	**Verify LEDs go OFF**		**Capture key**	**Verify LEDs go ON**		**Go to next key**
	Peer 1A output 3/0	**Peer 1B output 2/16**		**Peer 1A output 3/0**	**Peer 1B output 2/16**	
EB006-1	□	□		□	□	
EB006-2	□	□		□	□	
EB006-3	□	□		□	□	
EB006-4	□	□		□	□	
EB006-5	□	□		□	□	
EB006-6	□	□		□	□	
EB007-1	□	□		□	□	
EB007-2	□	□		□	□	**Back to test**

Table 3 – Removal and Capture of EB006 and EB007 keys

	PLACE	**Peer 23** in **No Access** mode	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 24**
	PULL	**Any** EB006 **or** EB007 **key**	
□	**VERIFY**	**Peer 1A** output **3/0** goes	**OFF**
□	**VERIFY**	**Peer 1B** output **2/16** goes	**OFF**
□	**VERIFY**	**MCR** sees **Peer 23** Div A □ and Div B □ go to	**MODE 2**
	PLACE	**Peer 23** in **Restricted Access** mode	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 8**

□ **Check for acceptance of Test that all keys captive is a necessary condition for No Access mode**

1.8 Test any U-Up & V-Target Security System Chipmunk for Radiation and Fail-Safe Interlocks.

□	**VERIFY**	**MCR** sees Chipmunk **NMO# _____** as	**O.K.**
	PLACE	Peer 23 in **No Access (Mode 24)**	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 24**
□	**VERIFY**	**BF6 & DH2,3** Feed-forward **Switch** is	**ON**
	TURN ON	Critical Devices: **PS BF6/AGS1** and **PS DH2,3/AGS2**	
□	**VERIFY**	**MCR** sees Critical Devices: **PS BF6//AGS1** □ and **PS DH2,3/AGS2** □	**ON**
	OPEN	Reachback Devices: **BS1** and **BS2**	
□	**VERIFY**	**MCR** sees Reachback Devices: **BS1** □ and **BS2** □	**OPENED**
	PRESS	**Test button** on Chipmunk for **Radiation Interlock**	
□	**VERIFY**	**Peer 23** remains in **No Access**	**MODE 24**
□	**VERIFY**	**MCR** sees **Div A** □ and **Div B** □ Radiation	**TRIP**
□	**VERIFY**	**MCR** sees Reachback Devices: **BS1** □ and **BS2** □	**CLOSED**
□	**VERIFY**	**MCR** sees **Critical Devices: PS BF6/AGS1** □ and **PS DH2,3/AGS2** □ remain **(BS must be open)**	**ON**
	CLEAR	Rad **TRIP**	
□	**VERIFY**	Rad **TRIP** is	**CLEARED**
	OPEN	Reachback Devices: **BS1** and **BS2**	
□	**VERIFY**	**MCR** sees Reachback Devices: **BS1** □ and **BS2** □	**OPENED**
	REMOVE	**Power** from **Chipmunk**	
□	**VERIFY**	**Peer 23** goes to **Safe Access**	**MODE 2**
□	**VERIFY**	**MCR** sees **Div A** □ and **Div B** □ Failsafe	**TRIP**
	ADD	**Power** to **Chipmunk**	
□	**VERIFY**	**Chipmunk** is	**CHIRPING**
	CLEAR	Chipmunk **Interlocks**	
□	**VERIFY**	**MCR** sees Chipmunk **Interlocks**	**CLEARED**
□	**VERIFY**	**MCR** sees **Chipmunk** as	**O.K.**
	PLACE	Peer 23 in **Restricted Access (Mode 8)**	
□	**VERIFY**	**MCR** sees **Peer 23** in	**MODE 8**

□ **Check for acceptance of Test any U-Up & V-Target Security System Chipmunk for Radiation and Fail-Safe Interlocks.**

END OF TEST PROCEDURE

TTL: Sign for completion of initial testing: _____

Date: _____/____/_____

TTL: Sign for completion of final testing: _____

Date: _____/_____/_____